SOME FURTHER REMARKS UPON THE INFLUENCE OF LEUKÆMIA UPON PREGNANCY AND LABOR.[1]

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At the Washington Congress, three years ago, I read a paper before the Obstetrical Section upon the influence of leukæmia upon pregnancy and labor,[2] and gave a series of observations upon a patient who, while undoubtedly leukæmic, had passed safely through two pregnancies, borne two living children, and was, at the time, again well advanced in pregnancy. Cases had been observed where leukæmia seemed to begin during, or as the result of, pregnancy; but up to that time none had been recorded where a woman already leukæmic had become pregnant and borne a living child. By this case it seemed to be clearly proven that a *leukæmic mother* may bear a *non-leukæmic child*, and that consequently the fœtal and maternal circulations are separate and distinct, and the placental barricade impervious to leucocytes. It seemed also proven that leukæmic symptoms are aggravated during the course of pregnancy but subside rapidly after its conclusion, and that leukæmia does not necessarily prevent conception or even limit the frequency of its occurrence. A number of other interesting questions were incidentally suggested, especially touching the etiology and prognosis of the disease.

Since the Washington Congress several new cases have been reported which throw fresh light upon the subject.

Dr. Greene, of Morgantown, Indiana, reported two cases[3] which, though defective, are nevertheless of considerable value. The first was one of acute leukæmia in a primipara, proving fatal in six months. The second is doubtful, and cannot be admitted without further evidence. Dr. Greene reports to Prof. Jaggard[4] that his second patient has since been pregnant, and again developed leukæmic symptoms which disappeared after the induction of abortion.

Dr. Saenger, of Leipzig,[5] reported the case of a leukæmic mother who bore a healthy child, and another of a healthy mother who bore a leukæmic child. His article is by far the most complete which has yet been published, and is well worthy careful study.

Professor Jaggard, of Chicago,[6] has just reported another case where leukæmia developed a few weeks after confinement and terminated life within a year. His patient, æt. thirty-four, VI-para, with a good family history, had borne five healthy children, had no history herself of malaria, syphilis, alcoholism, or traumatism. Three weeks before her sixth labor she was in robust health and weighed one hundred and fifty-eight pounds. The puerperium was normal except for the failure of lactation, and she was up and at work on the tenth day. She then noticed stinging paroxysmal pains in the left hypochondrium but no tumor was perceptible. Menstruation appeared six weeks after labor and once again a little more than five months afterwards. Eight weeks after labor a splenic tumor was first noticed; thenceforth its growth was rapid, splenic pain, emaciation, and malaise increased, and she died eleven months and nineteen days after confinement. The disease was acute and progresssive. Blood: red corpuscles per c.mm. 3,255,000. White corpuscles per c.mm. 1,178,000. W : R = 1 : 2.7.

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[1] Read before the International Medical Congress, at Berlin, 1890.

[2] American Journal of the Medical Sciences, January, 1888.

[3] New York Medical Journal, February 11, 1888, p. 144.

[4] Medical News, July 19, 1890, p. 53.

[5] Archiv für Gyn., Bd. xxxiii. Hft. 2.

[6] Medical News, July 19, 1890, p. 49.

Prof. Jaggard remarks: "The history of the case seems to point to some necessary relation between pregnancy or between prolonged lactation during pregnancy, or both these factors, and the leukæmia. The evidence, indeed, is only probable, but it is sufficient to create a presumption."

Dr. W. O. Stillman, of Albany, sends me the notes of a case where leukæmia developed in the course of pregnancy and proved fatal one month after confinement. Mrs. T., æt. thirty-four, IV-para, first seen in October, 1887, was then suffering from general œdema, extreme pallor, dyspnœa, epistaxis, and general lymphatic enlargement. Blood: red corpuscles per c.mm. 800,000. W : R = 1 : 3. The child was healthy, and at last accounts was thriving well. The patient gave an account of similar symptoms in a minor degree during her second pregnancy; but she quite recovered after confinement.

Since my former article was written my patient has been safely delivered twice, and an opportunity has been afforded to make some further observations.

Mrs. S., æt. thirty-seven, VIII-para, ceased to menstruate May 5, 1887; morning sickness soon began and blood was vomited from time to time. The spleen and liver enlarged and became tender as in previous pregnancies.

July 22. Oblique line of splenic dulness 20.5 cm. (8 inches), and edge of spleen within 9 cm. (3½ inches) of the umbilicus. Downward in the axillary line the dulness extends 20 cm. (8 inches), reaching the crest of the ilium. No increase in hepatic dulness. Blood: red corpuscles per c.mm. 1,406,000. W : R = 1 : 20.

August 18. Looks more pale and puffy; splenic dulness about the same. Blood: red corpuscles per c.mm. 1,373,000. W : R = 1 : 3.

Since the last count the red cells have not diminished very much, but the white cells have enormously increased.

January 13, 1888. Since last examination has been in fairly good health, doing her household work and driving twice a week to market, but during the past fortnight the legs and feet have begun to swell, attacks of epistaxis have been more severe, and dyspnœa more troublesome. Blood: red corpuscles per c.mm. 2,330,000. White corpuscles per c.mm. 56,000. W : R = 1 : 42 nearly.

February 14. Since last examination her condition has grown rapidly worse; the œdema becoming more marked, the dyspnœa, cough and palpitation very distressing, and the attacks of epistaxis more frequent and severe. She was confined at her own home of a living child two hundred and eighty-four days from the cessation of the menses. Labor was rapid, very little blood was lost, the dyspnœa and palpitation were distressing, but were greatly relieved after the termination of labor. The next day the following counts were made (average of four counts): *Mother*, red corpuscles per c.mm. 2,100,000. White corpuscles per c.mm. 54,000. W : R = 1 : 39 nearly. *Child*, red corpuscles per c.mm. 6,600,000. White corpuscles per c.mm. 20,000. W : R = 1 : 330. *Umbilical artery*, red corpuscles per c.mm. 6,340,000. W : R = 1 : 350. *Umbilical vein*, red corpuscles per c.mm. 5,150,000. W : R = 1 : 300.

19*th*. Five days post-partem. Lochia scant, slimy, and offensive. Blood: *Mother*, red corpuscles per c.mm. 1,970,000. White corpuscles per c.mm. 65,000. W : R = 1 : 30. *Child*, red corpuscles per c.mm. 6,520,000. White corpuscles per c. mm. 20,000. W : R = 1 : 326.

Throughout the puerperium the temperature and pulse curves were normal. The breasts filled with thin watery milk, and, contrary to advice, she kept the child to the breast for three or four days. The child, though plump and healthy-looking at birth, never throve, but seemed to fail daily. After the first week nursing was entirely stopped and the child fed artificially. It took food eagerly but did not assimilate it. Diarrhœa and vomiting finally set in and the child died at the beginning of the fifth month. No autopsy was held. The mother did not convalesce as rapidly or satisfactorily as after her previous confinement, and it was fully nine months before she regained her usual degree of health. The menses reappeared in June, painful, profuse, lasting six or seven days, and confining her to bed. Menstruation continued regular throughout the winter and spring, but ceased once more on May 5, 1889. Nausea and vomiting and hæmatemesis began as before. The attacks of epistaxis began earlier, were more frequent and severe. Every three or four weeks a quantity of blood came away per rectum. Dizziness and vertigo became so distressing that she could not walk alone; she had to be led or supported when moving from place to place. Hot flashes, cold sweats, palpitation, cough, and dyspnœa added to her discomfort.

September 19, 1889. She entered the Montreal General Hospital and remained till October 5th under the care of Professor R. L. Macdonnell, to whom I am indebted for the notes of her case while there.

Liver dulness in mammary line extends from sixth rib to two inches below the costal margin, 14.7 c.m. (5¾ inches).

Splenic dulness in mid-axillary line extends downward and somewhat forward for 22–23 cm. (8½–9 inches) in an oblique direction, 19 cm. (7½ inches) transversely, reaches within one inch of the crest of the ilium, and within two inches of the umbilicus. A blowing murmur is heard over the mitral area, transmitted sightly to the left, and heard also at the base. No hypertrophy of the heart. Urine: sp. gr. 1025, heavy deposit of urates, no albumin, no sugar. Had several attacks of epistaxis while in hospital. Blood (Sept. 29th): Red corpuscles per c.mm. 2,300,000. W:R = 1:28.

November 30. Patient entered the Montreal Maternity almost in collapse. She fainted while being carried to her room. The breathing was rapid and labored, the heart's action embarrassed, the slightest attempt to rise from the recumbent position was followed by fainting. Nausea and vomiting were persistent, cough troublesome, temperature normal, pulse 120–160, and very feeble; she was sleepless and delirious, muttering and picking at the bed-clothes. Fœtal heart sounds could not be heard, neither could fœtal movements be felt. Hypodermic injections of ether were given till she rallied, and then enemata of brandy and beef-tea were administered every four hours. By the next day she was somewhat stronger, but a severe epistaxis brought her again to death's door. It was decided to empty the uterus as soon as she could bear manipulation. On December 3d, at 7 P. M., a bougie was passed into the uterine cavity. Slight pains began during the night. The following morning the os was found to be fully dilated and the head presenting. The membranes were ruptured at 11.30 A. M., and a dead child delivered in seventy minutes. Scarcely a trace of blood was to be seen when the placenta was pressed off fifteen minutes afterward. As the child was passing the vulva the patient fainted, the pulse flickered out, and for a few moments the heart's action seemed to have ceased, but repeated hypodermics of ether roused it to action. The lochia were slimy and offensive. Throughout the puerperium the temperature was normal or subnormal, but the pulse was rapid and variable. Persistent cough prevented sound sleep; a large quantity of frothy mucus was expectorated during the first six or seven days. There was more or less delirium for a week. No milk appeared in the breasts. Epistaxis occurred occasionally, and convalescence was slow. She left the Maternity on December 22, 1889. Even at the present time she remembers very little of what transpired during her stay in the Maternity, and nothing at all about her confinement. The child, born 213 days from the cessation of the menses, was small and poorly nourished, and had been dead for some days. Unfortunately the blood-counts made at the time of this confinement are unreliable and cannot be included with the others. Menstruation was reëstablished in March, and has continued regular, but profuse. She now attends to her ordinary duties, but feels much feebler than formerly. She still has occasional attacks of epistaxis, œdema of the lower extremities, and dyspnœa and vertigo when she goes up stairs. The hepatic enlargement remains about the same as before; the spleen has grown a little larger, extending now below the iliac crest and dipping into the false pelvis.

July 15, 1890. Blood: microscopically, nothing unusual. Red corpuscles, per c.mm. 4,000,000. W:R = 1:200. Hæmoglobin index, 75. Retina normal.

The children have been carefully examined, with the following results:

Walter, æt. eighteen, is sallow, delicate, tires easily on exertion, and is subject to epistaxis. Had articular rheumatism in 1880 and 1883, and again in April, 1890, in the Montreal General Hospital. During this last attack in hospital hepatic dulness was found to begin at the fifth rib and extend downward in the mammary line 11.5 cm. (4½ inches) to the costal border. Splenic dulness began at the seventh rib in the post-axillary line and extended downward 11.5 cm. (4½ inches), and transversely 10 cm. (4 inches). There was general glandular enlargement, the glands all over the body being distinctly felt, and not painful on pressure. At the present time the glands of the neck, groin, and axilla are enlarged. The following blood-counts have been made since last report:

February 19, 1888. Red corpuscles, per c.mm. 4,620,000. W:R = 1:230.

April 6, 1890. Red corpuscles, per c.mm. 2,500,000. W:R = 1:155.

July 15, 1890. Red corpuscles, per c.mm. 3,480,000. W:R = 1:117. Microscopically corpuscles show moderate poikilocytosis, blood-plates abundant, a few microcytes. Hæmoglobin index, 78.

Arthur, æt. seventeen, subject to epistaxis, otherwise in good health; spleen normal, no glandular enlargement.

Lydia, æt. fourteen. July 16, 1890, red corpuscles 5,240,000 per c.mm. W:R = 1:300. Hæmoglobin index, 85. Microscopically normal.

Louisa, æt. eleven. Resembles her mother very much in general appearance. Has had undoubted leukæmia once, and is generally ailing. Spleen and cervical glands enlarged. Blood (July 15, 1890): red corpuscles, per c.mm. 3,930,000. W:R = 1:150. Hæmoglobin index, 80. Blood is watery, normal microscopically.

Charles, æt. nine. Spleen enlarged, also glands of neck, groin, and axilla. Enjoys fairly good health. Blood (July 16, 1890): red corpuscles, per c.mm. 5,050,000. W:R = 1:250. Hæmoglobin index, 100. Normal microscopically.

Freddy, died aged six months. *Vide* former report. Had leukæmia in the Montreal General Hospital.

For the numerous blood-counts and careful microscopic examinations of the blood in this case I am indebted to Dr. Wyatt Johnson, demonstrator of pathology at McGill University, and for the ophthalmological report to Dr. John J. Gardner, assistant oculist to the Montreal General Hospital.

CONCLUSIONS.—From the observations now on record the following conclusions seem to be justified:

1. A leukæmic mother may go to full term and bear a healthy child.
2. Leukæmia tends to bring on labor prematurely or reduce the patient to such a critical state that the premature induction of labor becomes advisable.
3. Leukæmia in pregnant women tends to run a rapidly fatal course; yet occasionally its progress may be slow, though progressive.
4. During the first three or four months of gestation, a leukæmic patient may not suffer much inconvenience; but as intra-abdominal tension increases, her distress becomes greater, graver symptoms rapidly

develop, and the patient is quickly reduced to a pitiable and dangerous condition.

5. Leukæmia does not prevent the occurrence of pregnancy, nor does it seem to limit its frequency.

6. As regards the relative characters of blood in the maternal, fœtal, and placental circulation, later observations confirm those made on a previous occasion.

7. While epistaxis, hæmatemesis, and melæna may occur frequently during the progress of gestation, there may be no uterine hæmorrhage at the time of labor or during the puerperium.

8. Menstruation may be affected. In the case of Mrs. S. menstruation was scanty and painless before the appearance of leukæmia; since, it has been profuse and painful.

9. Leukæmia seems sometimes to have an injurious effect upon lactation. In Mrs. S., who had always been a good nurse, the function was either suppressed or the milk so altered in quality as to become unwholesome and injurious.

10. The question of hereditary influence or predisposition is unsettled, but the case of Mrs. S. is very suggestive. The grandmother, mother, and brother suffered from symptoms pointing to leukæmia; two of her own children have had undoubted leukæmia, all have had jaundice, most are subject to epistaxis, all have glandular enlargement and more or less anæmia. It is more than probable that some of these children will sooner or later develop leukæmia. One child at least (Louisa), born before her mother showed signs of leukæmia, suffered from well-marked leukæmia lienalis. Although a mother does not transmit leukæmia directly to her child, is it not very probable that she may transmit a tendency or predisposition thereto?

TABLE I.—(MRS. S.) BLOOD-COUNT; AVERAGE OF THREE COUNTS.

Date.		Red cells.	W. : R.	Remarks.
1885.	Sept. 17 . . .	2,400,000	1 : 40	In the Montreal General Hospital three months after confinement.
"	Sept. 25 . . .	2,900,000	1 : 17	Left Montreal General Hospital Nov. 2d.
"	Oct. 31 . . .	2,480,000	1 : 12½	
1886.	April 28 . . .	3,400,000	1 : 50	One month pregnant.
"	May 3 . . .	2,900,000	1 : 45	
"	Oct. 8 . . .	1,070,000	1 : 10	
"	Oct. 29 . . .	990,000	1 : 4	Two hours after delivery.
"	Nov. 1 . . .	1,100,000	1 : 20	
"	Nov. 9 . . .	1,900,000	1 : 35	Discharged from the Montreal Maternity.
1887.	July 22 . . .	1,406,000	1 : 20	Between two and three months pregnant.
"	Aug. 18 . . .	1,373,000	1 : 3	Between three and four months pregnant.
1888.	Jan. 13 . . .	2,330,000	1 : 42	
"	Feb. 15 . . .	2,100,000	1 : 39	The morning after delivery.
"	Feb. 19 . . .	1,970,000	1 : 30	Five days post partum.
1889.	Sept 29 . . .	2,300,000	1 : 28	
1890.	July 15 . . .	4,000,000	1 : 200	

TABLE II.—COMPARISON OF BLOOD-COUNTS OF MOTHER, CHILD, AND PLACENTA; AVERAGE OF THREE COUNTS.

Date.		Subject.	Red cells.	W. : R	Remarks.
1886.	Oct. 29	Mother . . .	990,000	1 : 4	Two hours after delivery.
"	Oct 29	Child . . .	5,210,000	1 : 175	Two hours after birth.
"	Oct. 29	Umb. vein (trunk)	4,610,000	1 : 173	Eighteen hours after expulsion of the placenta.
"	Oct. 29	" " (branch)	4,600,000	1 : 128	
"	Oct. 29	Umbilical artery .	5,410,000	1 : 270	
"	Oct. 29	Placental sinuses .	950,000	1 : 3.6	
1886.	Nov. 1	Mother . . .	1,100,000	1 : 20	
"	Nov. 1	Child . . .	5,000,000	1 : 150	
1888.	Feb. 15	Mother . . .	2,100,000	1 : 39	The morning after delivery.
"	Feb. 15	Child . . .	6,600,000	1 : 330	The morning after birth.
"	Feb. 15	Umbilical vein .	5,150,000	1 : 300	Twelve hours after expulsion of placenta.
"	Feb 15	" artery .	6,340,000	1 : 350	
"	Feb. 19	Mother . . .	1,970,000	1 : 30	Five days post partum.
"	Feb. 19	Child . . .	6,520,000	1 : 325	

TABLE III.—BLOOD-COUNTS OF CHILDREN; AVERAGE OF THREE COUNTS.

Date.		Name.	Red cells.	W. : R.	Remarks
1887.	July 13	Walter, æt. 15	3,355,000	1 : 200	
"	Aug. 18	" æt. 15	3,240,000	1 : 200	
1888.	Feb. 19	" æt. 16	4,620,000	1 : 230	
1890.	April 6	" æt. 18	2,500,000	1 : 155	In Montreal General Hospital.
"	April 6	" æt. 18	3,480,000	1 : 117	
1887.	July 13	Arthur, æt. 14	4,725,000	1 : 350	
1887.	July 13	Lydia, æt. 11	4,795,000	1 : 350	
1890.	July 16	" æt. 14	5,240,000	1 : 300	
1885.	Oct. 12	Louisa, æt. 6	1,912,000	1 : 15	Was in Montreal General Hospital, from October 5 to December 12, 1885, with leukæmia; spleen enlarged.
"	Dec. 2	" æt. 6	3,576,000	1 : 16	
1887.	July 13	" æt. 8	4,220,000	1 : 300	
"	Aug. 18	" æt. 8	3,183,000	1 : 240	In failing health.
1890.	July 15	" æt. 10	3,930,000	1 : 150	
1887.	July 13	Charles, æt. 6	4,525,000	1 : 350	
1890.	July 16	" æt. 9	5,050,000	1 : 250	
1885.	Sept. 15	Fred., æt. 3 mo.	………	………	Spleen enlarged, red corpuscles diminished, white increased; blood-count lost. Died at six months.